Sub D3





SEQUENCE LISTING

<110> Ludevid, Doloros
Torrent, Margarita
Alvarez, Inaki
Perez, Pascual

<120> Amino acid-enriched plant protein reserves, particularly lysine-enriched maize gamma-zein, and plants expressing such proteins

<130> 50062/004001

<140> 09/117,246
<141> 1998-12-03

<150> PCT/FR97/00167
<151> 1997-01-28

<150> FR96/01004
<151> 1996-01-29

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<210> 1
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<212> DNA
<213> Artificial Sequence

<220>
<223> based on Maize

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<220>
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<211> 17
<212> PRT
<213> Maize

<400> 3
Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln
 1               5                  10                  15
Pro

<210> 4
<211> 28
<212> PRT
<213> Maize

<400> 4
Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro
 1               5                  10                  15
Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln Pro
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<210> 5
<211> 20
<212> PRT
<213> Maize

<400> 5
Asp Gly Ile Asp Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu
 1               5                  10                  15
Phe Lys Leu Asp
            20

<210> 6
<211> 672
<212> DNA
<213> Maize

<220>
<221> CDS
<222> (1)...(672)

<400> 6
atg agg gtg ttg ctc gtt gcc ctc gct ctc ctg gct ctc gct gcg agc  48
Met Arg Val Leu Leu Val Ala Leu Ala Leu Leu Ala Leu Ala Ala Ser
 1               5                  10                  15

gcc acc tcc acg cat aca agc ggc ggc tgc ggc tgc cag cca ccg ccg  96
Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro

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                20                  25                  30

ccg gtt cat cta ccg ccg ccg gtg cat ctg cca cct ccg gtt cac ctg   144
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
         35                  40                  45

cca cct ccg gtg cat ctc cca ccg ccg gtc cac ctg ccg ccg ccg gtc   192
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
     50                  55                  60

cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg   240
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
 65                  70                  75                  80

cca cca tgc cac tac cct act caa ccg ccc cgg cct cag cct cat ccc   288
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
                 85                  90                  95

cag cca cac cca tgc ccg tgc caa cag ccg cat cca agc ccg tgc cag   336
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
            100                 105                 110

ctg cag gga acc tgc ggc gtt ggc agc acc ccg atc ctg ggc cag tgc   384
Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln Cys
        115                 120                 125

gtc gag ttt ctg agg cat cag tgc agc ccg acg gcg acg ccc tac tgc   432
Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr Cys
    130                 135                 140

tcg cct cag tgc cag tcg ttg cgg cag cag tgt tgc cag cag ctc agg   480
Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu Arg
145                 150                 155                 160

cag gtg gag ccg cag cac cgg tac cag gcg atc ttc ggc ttg gtc ctc   528
Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val Leu
                165                 170                 175

cag tcc atc ctg cag cag cag ccg caa agc ggc cag gtc gcg ggg ctg   576
Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly Leu
            180                 185                 190

ttg gcg gcg cag ata gcg cag caa ctg acg gcg atg tgc ggc ctg cag   624
Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu Gln
        195                 200                 205

cag ccg act cca tgc ccc tac gct gct gcc ggc ggt gtc ccc cac tga   672
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    210                 215                 220
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<210> 7
<211> 223
<212> PRT
<213> Maize

<400> 7
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            20                  25                  30
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
        35                  40                  45
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
    50                  55                  60
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65                  70                  75                  80
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
                85                  90                  95
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
            100                 105                 110
Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln Cys
        115                 120                 125
Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr Cys
    130                 135                 140
Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu Arg
145                 150                 155                 160
Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val Leu
                165                 170                 175
Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly Leu
            180                 185                 190
Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu Gln
        195                 200                 205
Gln Pro Thr Pro Cys Pro Tyr Ala Ala Ala Gly Gly Val Pro His
    210                 215                 220

<210> 8
<211> 693
<212> DNA
<213> maize

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<221> CDS
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Met Arg Val Leu Leu Val Ala Leu Ala Leu Leu Ala Leu Ala Ala Ser
 1               5                  10                  15

gcc acc tcc acg cat aca agc ggc ggc tgc ggc tgc cag cca ccg ccg   96

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Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
             20                  25                  30

ccg gtt cat cta ccg ccg ccg gtg cat ctg cca cct ccg gtt cac ctg   144
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
         35                  40                  45

cca cct ccg gtg cat ctc cca ccg ccg gtc cac ctg ccg ccg ccg gtc   192
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
     50                  55                  60

cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg   240
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
 65                  70                  75                  80

cca cca tgc cac tac cct act caa ccg ccc cgg atc gaa ttc aaa cca   288
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Ile Glu Phe Lys Pro
                 85                  90                  95

aag cca aag ccg aag cca aaa gaa ttc aaa cca aag cca aag ccg aag   336
Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro Lys Pro Lys Pro Lys
            100                 105                 110

cca aaa gaa ttc ctg cag ccc ctg cag gga acc tgc ggc gtt ggc agc   384
Pro Lys Glu Phe Leu Gln Pro Leu Gln Gly Thr Cys Gly Val Gly Ser
        115                 120                 125

acc ccg atc ctg ggc cag tgc gtc gag ttt ctg agg cat cag tgc agc   432
Thr Pro Ile Leu Gly Gln Cys Val Glu Phe Leu Arg His Gln Cys Ser
    130                 135                 140

ccg acg gcg acg ccc tac tgc tcg cct cag tgc cag tcg ttg cgg cag   480
Pro Thr Ala Thr Pro Tyr Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln
145                 150                 155                 160

cag tgt tgc cag cag ctc agg cag gtg gag ccg cag cac cgg tac cag   528
Gln Cys Cys Gln Gln Leu Arg Gln Val Glu Pro Gln His Arg Tyr Gln
                165                 170                 175

gcg atc ttc ggc ttg gtc ctc cag tcc atc ctg cag cag cag ccg caa   576
Ala Ile Phe Gly Leu Val Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln
            180                 185                 190

agc ggc cag gtc gcg ggg ctg ttg gcg gcg cag ata gcg cag caa ctg   624
Ser Gly Gln Val Ala Gly Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu
        195                 200                 205

acg gcg atg tgc ggc ctg cag cag ccg act cca tgc ccc tac gct gct   672
Thr Ala Met Cys Gly Leu Gln Gln Pro Thr Pro Cys Pro Tyr Ala Ala
    210                 215                 220
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gcc ggc ggt gtc ccc cac tga                                          693
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<210> 9
<211> 230
<212> PRT
<213> maize

<400> 9
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            20                  25                  30
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
        35                  40                  45
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
    50                  55                  60
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65                  70                  75                  80
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Ile Glu Phe Lys Pro
                85                  90                  95
Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro Lys Pro Lys Pro Lys
            100                 105                 110
Pro Lys Glu Phe Leu Gln Pro Leu Gln Gly Thr Cys Gly Val Gly Ser
        115                 120                 125
Thr Pro Ile Leu Gly Gln Cys Val Glu Phe Leu Arg His Gln Cys Ser
    130                 135                 140
Pro Thr Ala Thr Pro Tyr Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln
145                 150                 155                 160
Gln Cys Cys Gln Gln Leu Arg Gln Val Glu Pro Gln His Arg Tyr Gln
                165                 170                 175
Ala Ile Phe Gly Leu Val Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln
            180                 185                 190
Ser Gly Gln Val Ala Gly Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu
        195                 200                 205
Thr Ala Met Cys Gly Leu Gln Gln Pro Thr Pro Cys Pro Tyr Ala Ala
    210                 215                 220
Ala Gly Gly Val Pro His
225                 230


<210> 10
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<212> DNA
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<220>
<221> CDS
<222> (1)...(723)
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 1               5                  10                  15

gcc acc tcc acg cat aca agc ggc ggc tgc ggc tgc cag cca ccg ccg   96
Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
            20                  25                  30

ccg gtt cat cta ccg ccg ccg gtg cat ctg cca cct ccg gtt cac ctg   144
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
        35                  40                  45

cca cct ccg gtg cat ctc cca ccg ccg gtc cac ctg ccg ccg ccg gtc   192
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
    50                  55                  60

cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg   240
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65                  70                  75                  80

cca cca tgc cac tac cct act caa ccg ccc cgg cct cag cct cat ccc   288
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
                85                  90                  95

cag cca cac cca tgc ccg tgc caa cag ccg cat cca agc ccg tgc cag   336
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
            100                 105                 110

atc gaa ttc aaa cca aag cca aag ccg aag cca aaa gaa ttc ctg cag   384
Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln
        115                 120                 125

ccc ctg cag gga acc tgc ggc gtt ggc agc acc ccg atc ctg ggc cag   432
Pro Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln
    130                 135                 140

tgc gtc gag ttt ctg agg cat cag tgc agc ccg acg gcg acg ccc tac   480
Cys Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr
145                 150                 155                 160

tgc tcg cct cag tgc cag tcg ttg cgg cag cag tgt tgc cag cag ctc   528
Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu
                165                 170                 175

agg cag gtg gag ccg cag cac cgg tac cag gcg atc ttc ggc ttg gtc   576
Arg Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val
            180                 185                 190

ctc cag tcc atc ctg cag cag cag ccg caa agc ggc cag gtc gcg ggg   624
Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly
```

```
        195                 200                 205

ctg ttg gcg gcg cag ata gcg cag caa ctg acg gcg atg tgc ggc ctg   672
Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu
    210                 215                 220

cag cag ccg act cca tgc ccc tac gct gct gcc ggc ggt gtc ccc cac   720
Gln Gln Pro Thr Pro Cys Pro Tyr Ala Ala Ala Gly Gly Val Pro His
225                 230                 235                 240

tga                                                               723
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<210> 11
<211> 240
<212> PRT
<213> Maize

<400> 11

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Met Arg Val Leu Leu Val Ala Leu Ala Leu Leu Ala Leu Ala Ala Ser
 1               5                  10                  15
Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
            20                  25                  30
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
        35                  40                  45
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
    50                  55                  60
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65                  70                  75                  80
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
                85                  90                  95
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
            100                 105                 110
Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln
        115                 120                 125
Pro Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln
    130                 135                 140
Cys Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr
145                 150                 155                 160
Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu
                165                 170                 175
Arg Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val
            180                 185                 190
Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly
        195                 200                 205
Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu
    210                 215                 220
Gln Gln Pro Thr Pro Cys Pro Tyr Ala Ala Ala Gly Gly Val Pro His
225                 230                 235                 240
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